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Pesticide Fact Sheet Number 103.1
Cadmium Salts

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16. Abstract (Limit: 200 words)

This document contains up-to-date chemical information, including a summary of the Agency's regulatory position and rationale, on a specific pesticide or group of pesticides. A Fact Sheet is issued after one of the the following actions has occurred.

1. Issuance or reissuance of a registration standard,
2. Issuance of each special review document,
3. Registration of a significantly changed use pattern,
4. Registration of a new chemical, or
5. An immediate need for information to resolve controversial issues relating to a specific chemical or use pattern.

17. Document Analysis a. Descriptors

Pesticides, regulations, Chemical Information Fact Sheet, Use Patterns, science findings.

b. Identifiers/Open-Ended Terms

c. COSATI Field/Group

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EPA

Pesticide Fact Sheet

Name of Chemical: Cadmium salts
Reason for Issuance: Final Determination of Special Review
Date Issued: AUG 5 1987
Fact Sheet Number: 103.1

1. Description of chemicals

Chemical names: cadmium carbonate
cadmium chloride
cadmium sebacate
cadmium succinate
anilinocadmium dilactate

Common names: Same as above

Trade names: None

EPA Shaughnessy codes: 012901, 012902, 012903, 012904, 064601

Chemical abstracts service (CAS) numbers: 134A, 135, 136A, 136B, 051D

Years of Initial Registration: 1949-1952

Pesticide type: fungicides

Chemical family: cadmium salts

U.S. producers: W. A. Cleary and Mallinckrodt

2. Use Patterns and Formulations

Application sites: Golf course and home lawn turf.

Types of formulations: Wettable powders, dusts, and granulars.

Types and methods of application: Ground application by hand-held sprayers and boom sprayers.

3. Science Findings

Physical and Chemical Characteristics-

Physical state:	solid
Boiling point:	765° C
Melting point:	321° C

Human Toxicology Characteristics-

°Acute toxicity:

Moderate to moderately high (Toxicity Categories III and II); specific values are unavailable for each compound since there are no technical registrations and there are data gaps on formulated products.

Acute effects to kidneys are formation of fatty bodies in the kidneys and degeneration of renal tubules.

°Chronic toxicity:

Oncogenic as demonstrated in laboratory animal and human epidemiological studies:

Rat chronic inhalation study -- LOEL 12.5 ug Cd chloride/m^3 (lowest dose tested) for lung tumors.

Rat chronic injection study -- 3.6% Cd chloride (lowest concentration tested) caused testicular and pancreatic islet tumors.

Epidemiological studies of factory workers -- chronic exposure to cadmium oxide and dust has shown statistically significant increases in the incidence of lung tumors.

Kidney effects of proteinuria, glucosuria, excretion of amino acids and decreased renal function:

Rat drinking water study (24 wks) -- NOEL 10 mg/L (lowest dose tested) for proteinuria.

Epidemiological study of factory workers exposure to cadmium oxide dust (50 yrs) -- LOEL 2 ug/m^3 for renal tubular proteinuria.

Mutagenic effects from 36 studies on various cadmium compounds are equivocal; depending on protocol and end point examined, results vary.

Teratogenic, fetotoxic and reproductive effects have been shown in laboratory animal studies however, the data are inadequate to support that cadmium would produce these types of effects in humans. Further, the data suggest that these effects are dependent on routes of administration which may not be analagous to human exposures from the pesticidal use.

4. Summary of regulatory position and rationale

On October 10, 1986, a FEDERAL REGISTER Notice (51 FR 36524) was published concerning the Special Review of all pesticide products containing cadmium compounds registered for use on golf course and home lawn turf. The Notice announced EPA's Preliminary Determination to cancel all registrations and deny applications of all pesticide products that contain cadmium compounds (salts of chloride, sebacate, succinate, carbonate and anilino cadmium dilactate) as active ingredients that are registered for use on turf of golf courses and home lawns based on oncogenic and kidney risks. The Support Document included an assessment of the hazard to applicators, the benefits of use on golf courses and home lawns, and a discussion of measures to reduce exposure to applicators.

In evaluating the hazards to applicators, the Agency concluded that there is up to a 10^{-4} lifetime risk of oncogenicity to golf course applicators applying cadmium to greens and tee areas (with hand-held sprayers) and low kidney Effect Ratios (0.1 to 81) for both golf course and home lawn applicators. Based on available data, the Agency determined that some of the alternatives do not appear to pose a greater health hazard than cadmium.

The Agency also reviewed the benefits of cadmium on golf courses and home lawns. Estimates indicate that approximately 30,000 lbs of cadmium are used as turf fungicides annually. Nearly all of the use is on golf courses. The impact of cancellation would result in a cost increase of approximately $500 annually for each of the affected golf courses and a negligible cost increase to homeowners.

In weighing the risks and benefits, the Agency reviewed a number of options to reduce the risk to applicators. It considered requiring protective clothing (i.e., elbow length

gloves and half-face respirators) and prohibiting the use of hand-held sprayers as alternatives to cancellation. It concluded that for golf course applicators, elbow length gloves would not sufficiently reduce kidney risks. Requiring half-face respirators could reduce oncogenic risks one order of magnitude but the Agency does not believe that this equipment would be rigorously utilized. Prohibiting the use of hand-held spray equipment could reduce both oncogenic and kidney risks. For home lawn applicators, kidney risks would not be sufficiently reduced by requiring elbow length gloves, as the Agency believes this equipment would not be rigorously utilized for the home lawn use pattern. Prohibiting the use of hand-held spray equipment would be tantamount to cancellation due to a lack of suitable alternative application equipment.

In consideration of the toxicological effects of cadmium compounds, the estimated potential risks of these effects to applicators, the lack of effective measures to mitigate these unacceptable risks, the availability of effective alternatives and an estimated minor economic impact to users, the Agency concluded that the risks of continued use of cadmium pesticide products outweighed the benefits. Therefore, the Agency proposed cancellation of all pesticidal uses of cadmium compounds.

During the comment period that followed publication of the Preliminary Determination, the Agency received three comments and additional use information. All comments have been considered and are addressed in the Final Determination. The new use information indicated that most golf course applicators use power spray equipment (i.e., mini-boom sprayers and walking boom sprayers) rather than hand-held sprayers to apply cadmium to greens and tee areas. The Agency reviewed its existing data base and determined that it lacked adequate data on this application method. In order to assess the risk of oncogenic and kidney effects from the use of this equipment, the Agency has required applicator exposure data through a Data Call In Notice. These data are required to be submitted to the Agency by July 1988 at which time the Agency will reassess the applicator risks from the use of power spray equipment and determine if further regulatory action is necessary.

The weight of evidence continues to lead the Agency to conclude that the oncogenic and kidney risks associated with the use of cadmium on golf course greens and tee areas (with hand-held sprayers) and the kidney risks associated with the use of cadmium on golf course fairways and home lawns outweigh the low benefits and that cancellation of these uses is the only appropriate action. As the Agency cannot currently assess the risks to golf course applicators applying cadmium to greens and tee areas by mini-boom sprayers, it will allow continued use of cadmium on golf course greens and tee areas with modifications in the terms and conditions of registration such as "Restricted Use," application to greens and tee areas only, application by mini-boom sprayers only, and protective clothing (chemical resistant gloves, long sleeve shirts and long legged pants during application and

chemical resistant aprons during mixing and loading) requirements until applicator exposure data is received and reviewed.

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